

ABC X1 Smartwatch Sentiment Analyzer

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Problem Statement & Objectives

Problem Statement:

- Need to quickly identify customer satisfaction patterns
- ABC X1 Smartwatch requires data-driven product insights

Objectives:

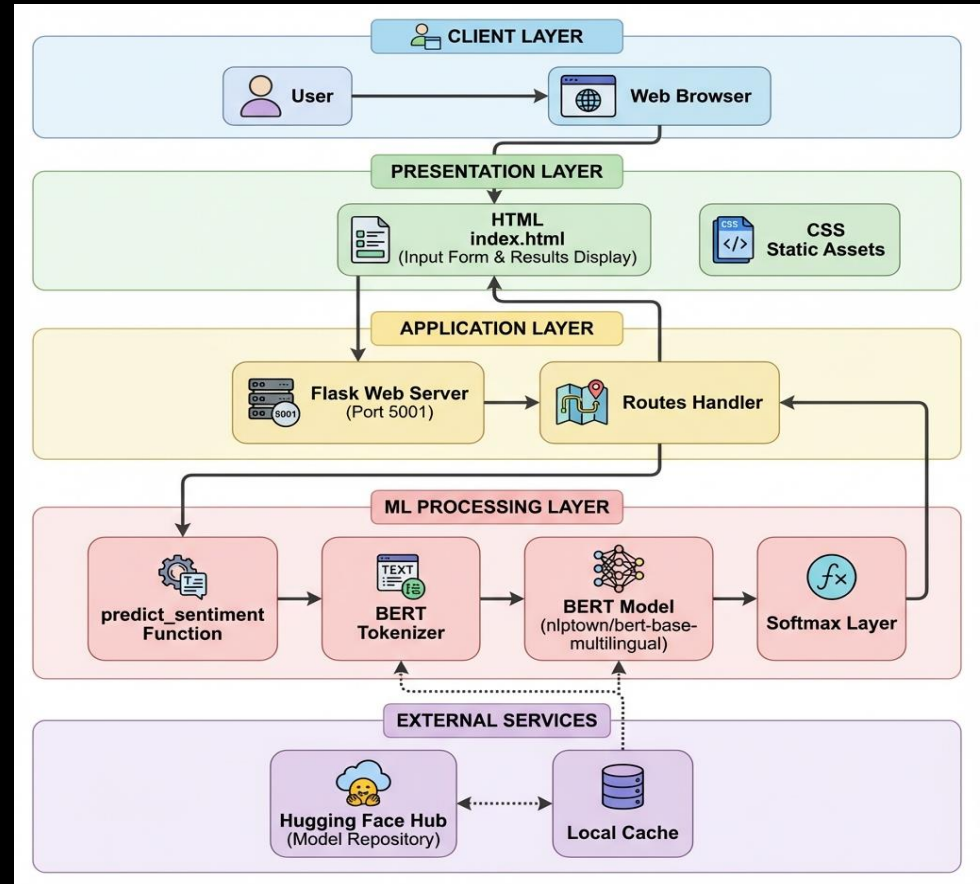
- Build automated sentiment analysis system
- Classify reviews: Positive / Neutral / Negative
- Deploy as user-friendly web application
- Achieve high accuracy using state-of-the-art NLP models

Proposed Solution & System Architecture

Solution: Pre-trained BERT Transformer Model

Workflow:

1. Data Collection & Preparation (6,000+ reviews)
2. Exploratory Data Analysis
3. Model Selection (Classical ML vs. BERT)
4. BERT Model Integration
5. Flask Web Application Deployment
6. Testing & Validation



Dataset & Methodology

Dataset:

- smart_watch_review.csv (6,000+ reviews)
- Star ratings (1-5) mapped to sentiments
- Cleaned and preprocessed data

Methodology:

Phase 1: Classical ML Models

- Logistic Regression, Random Forest, SVM, KNN, etc.
- Result: <50% accuracy

Phase 2: Pre-trained BERT Transformer

- nlptown/bert-base-multilingual-uncased-sentiment
- Result: High accuracy

Technologies & Model Pipeline

Machine Learning:

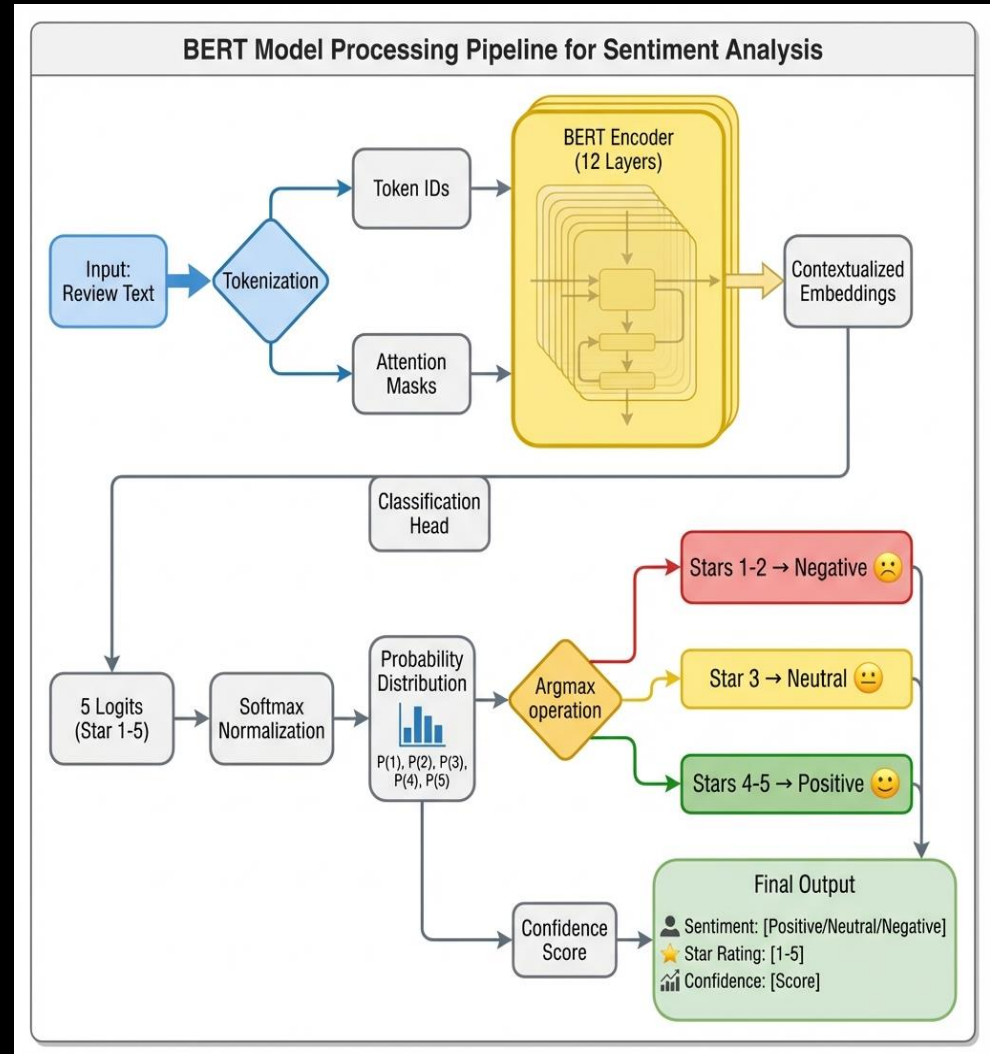
- Hugging Face Transformers (BERT)
- PyTorch (Deep Learning Framework)
- Scikit-learn (Evaluation Metrics)

Web Development:

- Flask (Python Web Framework)
- HTML/CSS (Frontend UI)

Data Processing:

- Pandas, NumPy (Data manipulation)



Results & Findings

Model Performance:

- BERT Model: High accuracy on sentiment classification
- Successfully predicts Positive/Neutral/Negative
- Provides confidence scores for predictions

Verified Test Cases:

- "Worst watch ever" → Negative
- "It is okay, average" → Neutral
- "Amazing watch, love it!" → Positive

Key Insights:

- BERT outperforms classical ML models significantly
- Pre-trained models eliminate need for feature engineering
- Transfer learning is crucial for NLP tasks

Conclusion & Future Scope

Conclusion:

- Successfully built sentiment analysis system using BERT
- Deployed as Flask web application with professional UI
- Provides actionable insights from customer reviews
- Demonstrated superiority of transformers over classical ML

Future Scope:

- Aspect-based sentiment analysis (battery, display, features)
- Multi-language support expansion
- Real-time dashboard for review monitoring
- Integration with customer support systems
- Mobile application deployment